CLAIMS

What is claimed is:

1   1. A method for compressing image data corresponding to an

2   image comprising a plurality of pixels defining a grid, each pixel having at

3   least one component value, comprising:

4   dividing the grid into at least one rectangular area;

5   for each rectangular area:

6   dividing the rectangular area into a number of triangles,

7   each triangle defining a boundary comprising three edges;

8   for each of triangle:

9   identifying the vertices of the triangle;

10   determining predicted pixel component values for at

11   least a portion of the pixels enclosed within and/or on the

12   boundary of the triangle;

13   comparing the predicted pixel component values with

14   actual values of said at least one component value to

15   determine if a similarity threshold is met;

16   processing a next triangle if the similarity threshold is

17   met, otherwise,

18   dividing the triangle into two new triangles, each

19   defining a boundary and comprising three edges; and

20   reiteratively repeating identifying the vertices,

21   predicting pixel component values, and comparing actual

22   and predicted pixel component values to determine if a

23   similarity threshold is met for each existing triangle and any

24   new triangles that are created; and

25   generating compressed image data defining each triangle

26   that is created and actual and predicted pixel component values

27   within the triangle.

1   2. The method of claim 1, wherein the compressed image data

2   comprises at least one string, the method further comprising compressing

3   said at least one string using a data compression algorithm.

1   3. The method of claim 1, wherein at least a portion of the triangles

2   are defined by data identifying pixels coincident with or proximate to a set

3   of vertices for the triangle, and the predicted pixel component values for

4   those triangles are determined by interpolating actual pixel component

5   values at the vertices of each triangle.

1   4. The method of claim 1, wherein the predicted pixel component

2   values are determined by interpolating actual component values

3   corresponding to pixels that lie on and/or proximate to the edges of each

4   triangle.

1   5. The method of claim 1, wherein the image is a grayscale image,

2   and said at least one component value comprises a grayscale intensity

3   level.

1   6. The method of claim 1, wherein the image comprises a color

2   image, and said at least one component value comprises three color

3   component values.

1   7. The method of claim 6, wherein the three color component

2   values comprise a Red component value, a Green component value, and

3   a Blue component value, further comprising converting the Red, Green,

4   and Blue component values into luminance/chrominance component

5   values.

1   8. The method of claim 7, wherein said comparing of the predicted

2   pixel component values to determine if the similarity threshold is met

3   comprises giving a similarity determination that compares predicted and

4   actual luminance component values greater weight than a similarity

5   determination that considers predicted and actual chrominance

6   component values.

1   9. The method of claim 1, further comprising:

2   determining if a texture map can be applied to pixels of a given

3   triangle to meet the similarity threshold; and

4   storing data identifying the pixels within and/or on the triangle

5   boundary and data corresponding to the texture map for any triangle for

6   which it is determined that texture mapping can be applied.

1   10. The method of claim 1, wherein each of said at least one

2   rectangle comprises a square.

1   11. The method of claim 10, wherein the image comprises a

2   plurality of pixels contained within a rectangular grid, and wherein the

3   rectangular grid is divided into a number of non-overlapping squares that

4   contain all of the pixels within the rectangular grid.

1   12. The method of claim 1, wherein at least one triangle comprises

2   a right angle corner and a hypotenuse, and where dividing said at least

3   one triangle into two triangles comprises dividing said at least one triangle

4   along a line connecting a midpoint of the hypotenuse to the right angle

5   corner.

1   13. A method for reproducing an image based on a set of

2   compressed image data corresponding to an original image comprising a

3   plurality of pixels defining a grid, said compressed image data including

4   data defining a plurality of triangles and pixel component values

5   corresponding to each of said plurality of triangles, comprising:

6   extracting a set of vertices for each of said plurality of triangles;

7   determining component values of pixels within each triangle;

8   rendering each triangle in accord with the set of vertices and

9   component values determined for that triangle.

1   14. The method of claim 13, wherein the compressed image data

2   includes pixel component values for pixels coincident with or proximate to

3   each vertex, and the pixel component values corresponding to other

4   pixels within each triangle are determined as a function of the pixel

5   component values at the vertices of the triangle.

1   15. The method of claim 14, wherein the pixel component values

2   corresponding to the other pixels within each triangle are determined by

3   interpolating the pixel component values at the vertices of the triangle.

1   16. The method of claim 13, wherein the compressed image data

2   includes data pertaining to sets of pixels defining edges of at least a

3   portion of said plurality of triangles and including pixel component values

4   for those pixels, further wherein the pixel component values for the

5   triangles are determined as a function of the pixel component values

6   corresponding to the pixels defining the edges of the triangles.

1   17. The method of claim 13, wherein the compressed image data

2   includes texture mapping data, further including:

3   determining any triangles from among said plurality of triangles to

4   which texture mapping is to be applied; and

5   applying texture mapping to the pixels contained within those

6   triangles.

1   18. The method of claim 13, wherein the compressed image data

2   corresponds to a color image and includes pixel component data in

3   accordance with a luminance/chrominance color model, further comprising

4   converting the luminance/chrominance color model data to red, green and

5   blue (RGB) color components for each pixel.

1   19. The method of claim 13, further comprising rendering said

2   plurality of triangles such that enclosing larger triangles are rendered prior

3   to enclosed smaller triangles.

1   20. A system for compressing image data corresponding to an

2   image comprising a plurality of pixels defining a grid, each pixel having at

3   least one component value, comprising:

4   a memory in which machine instructions are stored; and

5   a processor coupled to the memory for executing the

6   machine instructions, said processor implementing a plurality of functions

7   when executing the machine instructions, including:

8   dividing the grid into at least one rectangular area;

9   for each rectangular area:

10   dividing the rectangular area into a number of triangles,

11   each triangle defining a boundary comprising three edges;

12   for each of triangle:

13   identifying the vertices of the triangle;

14   determining predicted pixel component values for at

15   least a portion of the pixels enclosed within and/or on the

16   boundary of the triangle;

17   comparing the predicted pixel component values with

18   actual values of said at least one component value to

19   determine if a similarity threshold is met;

20   processing a next triangle if the similarity threshold is

21   met, otherwise,

22   dividing the triangle into two new triangles, each

23   defining a boundary and comprising three edges; and

24   reiteratively repeating identifying the vertices,

25   predicting pixel component values, and comparing actual

26   and predicted pixel component values for each existing

27   triangle and any new triangles that are created; and

28   generating compressed image data defining each triangle that is

29   created and actual and predicted pixel component values within the

30   triangle.

1   21.   The system of claim 20, wherein at least a portion of the

2   triangles are defined by data identifying pixels coincident with or

3   proximate to a set of vertices for the triangle, and the predicted pixel

4   component values are determined by interpolating actual pixel component

5   values at the vertices of each triangle.

1   22. The system of claim 20, wherein the predicted pixel

2   component values are determined by interpolating actual component

3   values corresponding to pixels that lie on and/or proximate to the edges of

4   each triangle.

1   23. The system of claim 20, wherein the image comprises a color

2   image, and said at least one component value comprises a Red

3   component value, a Green component value, and a Blue component

4   value, and wherein execution of the machine instructions by the processor

5   further implements the function of converting the Red, Green, and Blue

6   component values into luminance/chrominance component values.

1   24. The system of claim 20, wherein execution of the machine

2 instructions by the processor further implements the functions of:

3   determining if a texture map can be applied to pixels of a given

4 triangle to meet the similarity threshold; and

5   storing data identifying the pixels within and/or on the triangle

6 boundary and data corresponding to the texture map for any triangle for

7 which it is determined that texture mapping can be applied.

1   25. The system of claim 20, wherein the image comprises a

2 plurality of pixels contained within a rectangular grid, and wherein the

3 rectangular grid is divided into a minimum number of non-overlapping

4 squares that contain all of the pixels within the rectangular grid.

1   26. An article of manufacture for compressing image data

2 corresponding to an image comprising a plurality of pixels defining a grid,

3 each pixel having at least one component value, comprising:

4   a memory media adapted to be used with a computer; and

5   a plurality of machine instructions stored on the memory

6 media, said machine instructions effecting a plurality of functions when

7 executed by the computer, including:

8   dividing the grid into at least one rectangular area;

9   for each rectangular area:

10   dividing the rectangular area into a number of triangles,

11   each triangle defining a boundary comprising three edges;

12   for each of triangle:

13   identifying the vertices of the triangle;

14   determining predicted pixel component values for at

15   least a portion of the pixels enclosed within and/or on the

16   boundary of the triangle;

17   comparing the predicted pixel component values with

18   actual values of said at least one component value to

19   determine if a similarity threshold is met;

20   processing a next triangle if the similarity threshold is

21   met, otherwise,

22   dividing the triangle into two new triangles, each

23   defining a boundary and comprising three edges; and

24   reiteratively repeating identifying the vertices,

25   predicting pixel component values, and comparing actual

26   and predicted pixel component values for each existing

27   triangle and any new triangles that are created; and

28   generating compressed image data defining each triangle that is

29   created and actual and predicted pixel component values within the

30   triangle.

1   27. The article of manufacture of claim 26, wherein at least a

2   portion of the triangles are defined by data identifying pixels coincident

3   with or proximate to a set of vertices for the triangle, and the predicted

4   pixel component values are determined by interpolating actual pixel

5   component values at the vertices of each triangle.

1   28. The article of manufacture of claim 26, wherein the predicted

2   pixel component values are determined by interpolating actual component

3   values corresponding to pixels that lie on and/or proximate to the edges of

4   each triangle.

1   29. The article of manufacture of claim 26, wherein the image

2   comprises a color image, and said at least one component value

3   comprises a Red component value, a Green component value, and a Blue

4   component value, and wherein said functions effectuated when executed

5   by the computer further include the function of converting the Red, Green,

6   and Blue component values into luminance/chrominance component

7   values.

1   30. The article of manufacture of claim 26, wherein said functions

2   effectuated when executed by the computer further include the functions

3   of:

4   determining if a texture map can be applied to pixels of a given

5   triangle to meet the similarity threshold; and

6   storing data identifying the pixels within and/or on the triangle

7   boundary and data corresponding to the texture map for any triangle for

8   which it is determined that texture mapping can be applied.

1   31. The article of manufacture of claim 26, wherein the image

2   comprises a plurality of pixels contained within a rectangular grid, and

3   wherein the rectangular grid is divided into a minimum number of non-

4   overlapping squares that contain all of the pixels within the rectangular

5   grid.